Message

From: George Hay [GHay@fmtinc.com]
Sent: 7/18/2018 2:35:44 PM
To: Galbraith, Michael [Galbraith.Michael@epa.gov]
CC: Carl Palmer [cpalmer@tdxassociates.com]
Subject: Thermaldyne Dioxin Emissions Estimate

Mike,

The basis for the dioxin concentration in the Thermaldyne TO off gas is as follows:

Dioxin/furan emissions and thermal oxidizer destruction and removal efficiency (DRE) were measured during the compliance demonstration test (CDT) of the TD*X Associates Model 6042 Indirect Thermal Desorption Unit (TDU). The testing was performed to meet the requirements for conducting a CDT as part of USEPA Region 6 Consent Agreement and Final Order (CAFO) effective October 4, 2012. This CDT was performed at the US Ecology Texas TSDF in Robstown, Texas. The testing period was September 24 and 25, 2013. Test results showed average dioxin/furan emissions of 0.0004 ng-TEQ/dscm at a corresponding DRE of 99.99991%. Emission estimates for the Thermaldyne unit were extrapolated using TD*X stack test results of 0.0004 ng/dscm, divided by two, and ratio of TD*X 99.99991% DRE to Thermaldyne 99% DRE = 2.2 ng/dscm. I believe that the Thermaldyne emissions may actually exceed this estimate for the following reasons.

The Thermaldyne primary desorption chamber in the TDU provides substantial gas residence time at temperatures that are optimal for dioxin formation. The unit does not have an OPL for organic chlorine in the feedstream. Our review of similar material provided for reclamation at our Robstown unit indicates that our OPL restricted chlorine containing OBHSM can contain 500 ppm organic chlorine, on average. Those constituents are vaporized in the TDU primary, along with the oil from the feedstream. The feedstream contains significant concentration of carcinogenic polynuclear aromatic hydrocarbons (cPAH). In our experience, those will average about 1000 ppm or more in the OBHSM feedstream. That represents 20 lb-cPAH/hr being present in the gaseous state in the primary, along with 10 lb-chlorine/hr from the organic chlorine that is also desorbed.

Thermaldyne does not provide an active nitrogen inerting system, but rather allows oxygen from air in-leakage into the primary to be consumed by partial combustion in the primary. This gas mixture in the primary is intimately contacted by 9000 lb/hr of dry solids from the refinery, containing a substantial inventory of catalyst sites. The gas temperature range in the countercurrent flow primary is approximately 500-1000°F. The gas residence time in the primary at this condition is 15 to 30 seconds. These conditions are ideal for dioxin formation in the Thermaldyne TDU primary. For reasons that I will not disclose herein, the proposed thermal oxidizer as designed will be unable to mitigate dioxins in the primary desorber vent gas steam to the MACT EEE standards.

But the point is how will Thermaldyne control the emissions of dioxins, and other restricted pollutants? They need to be required to fully characterize their feedstream, disclose the design of their unit as it is intended to manage the control of emission of restricted pollutants, adopt interim OPLs to meet emission limits, conduct a CPT to demonstrate compliance with emission limits, and adopt final OPLs to assure continued compliance. The OPLs should include key process parameters such as residence time, temperature and excess air in the TO. Probably should also include a CEMS to assure proper conditions in the TO. They should also include feedstream limits based on verified operation in compliance with emission limits. The proposed variance, including the air permit with its complete lack of conditions, does nothing to ensure that a hazardous waste combustor will not exceed emission limits.

Further comments on the Thermaldyne unit are considered confidential engineering analysis by TD*X. We are reluctant to provide Thermaldyne with written engineering comments on their unit, however, we are happy to discuss them with you in a technical call. Please let me what day and time works best for you.

Respectfully,

George Hay